

Our ref: 6543-G2
13 September 2021




Suite 2.06 / 56 Delhi Road
North Ryde NSW 2113
02 9878 6005
assetgeoenviro.com.au

EVT / Kosciuszko Thredbo Pty Ltd
By email: peter_fleming@evt.com

Attention: Peter Fleming

Dear Peter,

	Department of Planning and Environment
<i>Issued under the Environmental Planning and Assessment Act 1979</i>	
Approved Application No DA 21/16265	
Granted on the 17 March 2022	
Signed Mark Brown	
Sheet No	7 of 8

Proposed Cruiser Blue Mountain Bike Trail, Thredbo NSW Geotechnical Assessment

1. Introduction

As requested by Mr Peter Fleming of EVT / Kosciuszko Thredbo Pty Ltd (KT), a Senior Principal Geotechnical Engineer (Mark Bartel) inspected the site on behalf of AssetGeoEnviro (Asset) on 21 May 2021. The site inspection consisted of site walkover observations, in the company of Mr Peter Fleming.

Documents supplied to us for this assessment are attached and comprised:

- Site Plan showing Cruiser Blue Alignment.

It is understood that the development comprises formation of a Mountain Bike Trail (MBT) that winds downhill in a southerly and south-westerly direction. Two platforms are proposed over intermittent watercourses.

This letter must be read in conjunction with the attached "Important Information about your Geotechnical Report". Attention is drawn to the limitations inherent in site investigations and the importance of verifying the subsurface conditions inferred herein.

2. Regional Topography & Geology

The regional topography comprises moderately to steeply sloping terrain flanking the north-easterly flowing Thredbo River, with ground slopes generally ranging from 10° to 30° and some locally steeper sections on the land flanking the river, and more gentle slopes over the river shoulders. Numerous drainage depressions and watercourses flow towards the river, with some of the persistent watercourses carved several metres into the underlying granite bedrock.

The site lies within the G line as defined in DIPNR's "Geotechnical Policy – Kosciuszko Alpine Resorts", November 2003.

Your trusted engineering professionals

The 1:250,000 Tallangatta Geological Map indicates the site is underlain by Silurian aged intrusive granite.

Cruiser Top Station is located about 2.5km north of Thredbo Village, as shown in Figure 1. The proposed alignment of the Cruiser Blue MBT is shown in the attached Figure 3.

3. Site inspection

The site was inspected on 21st May 2021.

Intermittent creek crossings are proposed at two locations. Typical photos of the terrain for the creek crossings are shown in Photos 1 and 2. A typical photo of natural terrain is shown in Photo 3.

The subsurface conditions are likely to comprise a mixture of slope wash and colluvial soils derived from weathered granite, overlying residual soils and variably weathered granite. Some minor filling (less than about 0.5m deep) may also be present for previous minor cut-to-fill earthworks for tracks in the vicinity.

Numerous scattered granite boulders are present across the landform.

Groundwater conditions are unknown, but it is expected that intermittent groundwater would be present within the soils overlying the weathered granite.

Surface drainage is typically by overland flow into intermittent creeks.

4. Conclusions & Recommendations

The relatively minor earthworks for the trails, and construction of the platforms across the intermittent creeks would not be expected to present a geotechnical constraint to the proposed development. However, the following recommendations should be followed to minimise the geotechnical risks:

1. Footings for platforms over intermittent creeks should be taken into the decomposed granite (dense medium to coarse sand) and may be designed for a maximum allowable bearing pressure of 200 kPa.
2. Alternatively, additional rocks (boulders) could be placed to provide sufficient surface area to then build a surfacing over the intermittent creeks. Boulders should be placed such that they are laid flat and not exhibit movement under the action of a minimum 3 tonne hydraulic excavator.
3. Rock excavation, where required, should be carried out using relatively low vibration / impact methods such as rock hammering or low-energy explosive charges in drill holes filled with water.
4. If poor subgrade materials (e.g. soft and / or wet soils) are encountered, or significant seepage is encountered which cannot be controlled by diversion drains, a qualified and experienced Geotechnical Engineer should be consulted for further advice.

The suitably completed Form 4 – Minimal Impact Certification - is attached.

5. Limitations

In addition to the limitations inherent in site investigations (refer to the attached Information Sheets), it must be pointed out that the recommendations in this report are based on assessed subsurface conditions from limited investigations.

Asset accepts no liability where our recommendations are not followed or are only partially followed. The attached document “Important Information about your Geotechnical Report” provides additional information about the uses and limitations of this report.



Please do not hesitate to contact the undersigned if you have any questions regarding this report or if you require further assistance.

For and on behalf of

AssetGeoEnviro

A handwritten signature in blue ink that reads 'Mark Bartel'.

Mark Bartel

BE, MEngSc, GMQ, CPEng, RPEQ/NER(Civil), APEC IntPE(Aus)
Managing Director | Senior Principal Geotechnical Engineer

Encl: Site Photos

Site Locality (Figure 1)

Site Plan (Figure 3)

Form 4 – Minimal Impact Certification

Important Information about your Geotechnical Report

Document Control

Distribution Register

Copy	Media	Recipient	Location
1	Secure PDF	Peter Fleming	EVT / Kosciuszko Thredbo Pty Ltd
2	Secure PDF	Ivan Pasalich	Dabyne Planning
3	Secure PDF	Mark Bartel	Asset Geotechnical Engineering

Document Status

Rev	Revision Details	Author	Reviewer		Approved for Issue		
			Name	Initials	Name	Initials	Date
0	Initial issue	M. Bartel			M. Bartel	<i>MAB</i>	13 September 2021



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Site Photos



Photo 1

Typical terrain in
platform area over
watercourse

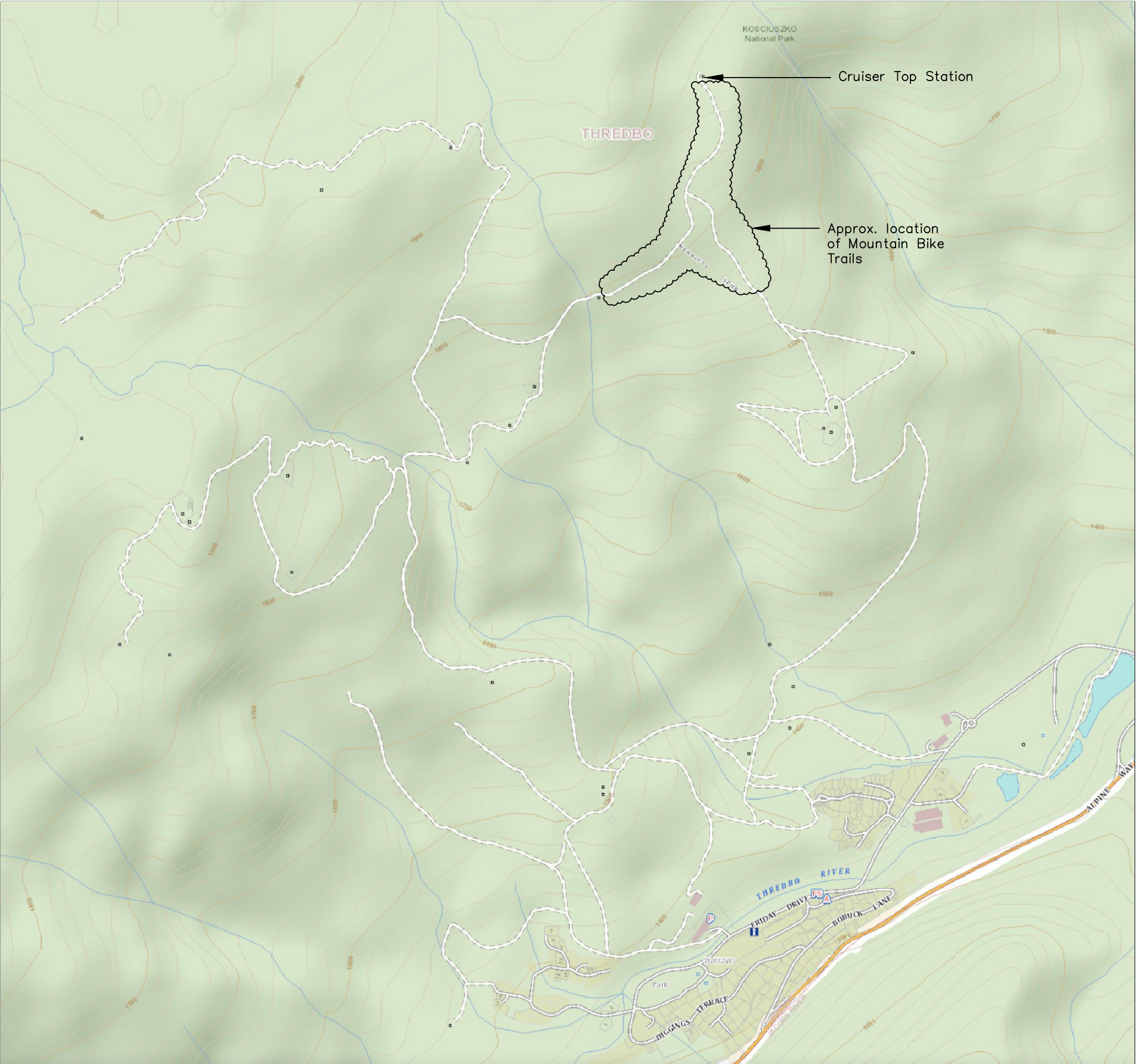


Photo 2

Typical terrain in
platform area over
watercourse



Photo 3
Typical terrain for
MTB trail



Approximate only – subject to detail survey.
Source: SixMaps.
This drawing is used to illustrate site locality
only and must not be used for any other
purpose. Copyright of source drawing remains
with SixMaps.

0 1:12,500 A3 500m

issue	date	description
A	13.9.21	Initial issue



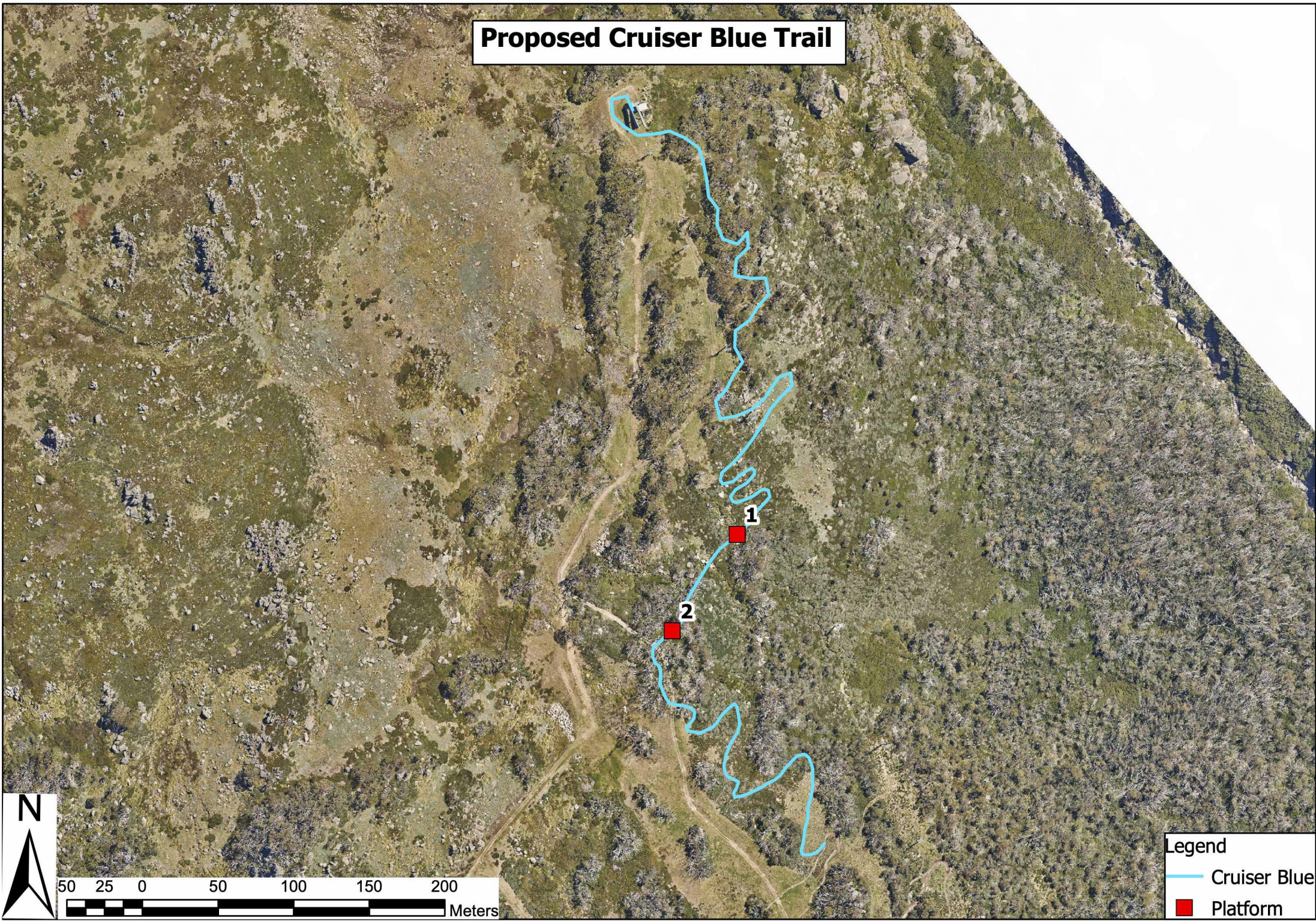
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Proposed Cruiser Green & Blue
Mountain Bike Trails
Thredbo NSW
for
EVT / Kosciuszko Thredbo Pty Ltd

Site Locality

drawn: MAB
date: 13.9.2021
checked: MAB
scale: 1:12,500 A3

job no.: 6543	fig: 1	issue: A



Approximate only – subject to detail survey.
Source: EVT / Kosciuszko Thredbo Pty Ltd.
This drawing is used to illustrate site layout only
and must not be used for any other purpose.
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Kosciuszko Thredbo Pty Ltd.

issue	date	description
A	13.9.21	Initial issue


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Proposed Cruiser Blue Mountain Bike
Trail
Thredbo NSW
for
EVT / Kosciuszko Thredbo Pty Ltd
Site Plan

drawn: MAB
date: 13.9.2021
checked: MAB
scale: 1:3,000 A3

job no.: 6543	fig: 3	issue: A



Geotechnical Policy – Kosciuszko Alpine Resorts

Form 4 – Minimal Impact Certification

Date received: ____/____/____

DA no: _____

This form may be used where minor construction works which present minimal or no geotechnical impact on the site or related land are proposed to be erected within the “G” line area of the geotechnical maps. A geotechnical engineer or engineering geologist must inspect the site and/or review the proposed development documentation to determine if the proposed development requires a geotechnical report to be prepared to accompany the development application. Where the geotechnical engineer determines that such a report is not required then they must complete this form and attach design recommendations where required. A copy of form 4 with design recommendation, if required, must be submitted with the development application.

Please contact the Alpine Resorts Assessments Team in Jindabyne for further information.
Phone 02 6456 1733.

To complete this form, please place a cross in the boxes ☐ and fill out the white sections.

1. Declaration made by geotechnical engineer or engineering geologist in relation to a nil or minimal geotechnical impact assessment and site classification

I,

Mr ☒ Ms ☐ Mrs ☐ Dr ☐ Other ☐

Mark Andrew

Family name

Bartel

OF

Company/organisation

AssetGeoEnviro

certify that I am a geotechnical engineer /engineering geologist as defined by the “Policy” and I have inspected the site and reviewed the proposed development known as

Cruiser Blue Mountain Bike Trail

As a result of my site inspection and review of the following documentation

(List of documentation reviewed)

Proposed Cruiser Blue Trail, unreferenced, undated



Department of Planning
and Environment

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Signed Mark Brown

Sheet No 8 of 8

I have determined that;

- ☒ the current load-bearing capacity of the existing building will not be exceeded or adversely impacted by the proposed development, and
- ☒ the proposed works are of such a minor nature that the requirement for geotechnical advice in the form of a geotechnical report, prepared in accordance with the "Policy", is considered unnecessary for the adequate and safe design of the structural elements to be incorporated into the new works, and
- ☒ in accordance with AS 2870.1 Residential Slabs and Footings, the site is to be classified as a type
(insert classification type)

Class S, subject to recommendations in attached letter

- ☒ I have attached design recommendations to be incorporated in the structural design in accordance with this site classification.

I am aware that this declaration shall be used by the Department as an essential component in granting development consent for a structure to be erected within the "G" line area (as identified on the geotechnical maps) of Kosciuszko Alpine Resorts without requiring the submission of a geotechnical report in support of the development application.

4. Signatures

Signature

Mark Bartel

Name

Mark Bartel

Chartered professional status

CPEng (35641) NER

Date

13 September 2021

5. Contact details

Alpine Resorts Assessments team

Snowy River Avenue

PO Box 36 JINDABYNE 2627

t: 02 6456 1733

f: 02 6456 1736

e: alpineresorts_assessments@dipnr.nsw.gov.au

Scope of Services

The geotechnical report ("the report") has been prepared in accordance with the scope of services as set out in the contract, or as otherwise agreed, between the Client and Asset Geotechnical Engineering Pty Ltd ("Asset"), for the specific site investigated. The scope of work may have been limited by a range of factors such as time, budget, access and/or site disturbance constraints.

The report should not be used if there have been changes to the project, without first consulting with Asset to assess if the report's recommendations are still valid. Asset does not accept responsibility for problems that occur due to project changes if they are not consulted.

Reliance on Data

Asset has relied on data provided by the Client and other individuals and organizations, to prepare the report. Such data may include surveys, analyses, designs, maps and plans. Asset has not verified the accuracy or completeness of the data except as stated in the report. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations ("conclusions") are based in whole or part on the data, Asset will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to Asset.

Geotechnical Engineering

Geotechnical engineering is based extensively on judgment and opinion. It is far less exact than other engineering disciplines. Geotechnical engineering reports are prepared for a specific client, for a specific project and to meet specific needs, and may not be adequate for other clients or other purposes (e.g. a report prepared for a consulting civil engineer may not be adequate for a construction contractor). The report should not be used for other than its intended purpose without seeking additional geotechnical advice. Also, unless further geotechnical advice is obtained, the report cannot be used where the nature and/or details of the proposed development are changed.

Limitations of Site Investigation

The investigation program undertaken is a professional estimate of the scope of investigation required to provide a general profile of subsurface conditions. The data derived from the site investigation program and subsequent laboratory testing are extrapolated across the site to form an inferred geological model, and an engineering opinion is rendered about overall subsurface conditions and their likely behavior with regard to the proposed development. Despite investigation, the actual conditions at the site might differ from those inferred to exist, since no subsurface exploration program, no matter how comprehensive, can reveal all subsurface details and anomalies.

The engineering logs are the subjective interpretation of subsurface conditions at a particular location and time, made by trained personnel. The actual interface between materials may be more gradual or abrupt than a report indicates.

Therefore, the recommendations in the report can only be regarded as preliminary. Asset should be retained during the project implementation to assess if the report's recommendations are valid and whether or not changes should be considered as the project proceeds.

Subsurface Conditions are Time Dependent

Subsurface conditions can be modified by changing natural forces or man-made influences. The report is based on conditions that existed at the time of subsurface exploration. Construction operations adjacent to the site, and natural events such as floods, or ground water fluctuations, may also affect

subsurface conditions, and thus the continuing adequacy of a geotechnical report. Asset should be kept apprised of any such events, and should be consulted to determine if any additional tests are necessary.

Verification of Site Conditions

Where ground conditions encountered at the site differ significantly from those anticipated in the report, either due to natural variability of subsurface conditions or construction activities, it is a condition of the report that Asset be notified of any variations and be provided with an opportunity to review the recommendations of this report. Recognition of change of soil and rock conditions requires experience and it is recommended that a suitably experienced geotechnical engineer be engaged to visit the site with sufficient frequency to detect if conditions have changed significantly.

Reproduction of Reports

This report is the subject of copyright and shall not be reproduced either totally or in part without the express permission of this Company. Where information from the accompanying report is to be included in contract documents or engineering specification for the project, the entire report should be included in order to minimize the likelihood of misinterpretation from logs.

Report for Benefit of Client

The report has been prepared for the benefit of the Client and no other party. Asset assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including without limitation matters arising from any negligent act or omission of Asset or for any loss or damage suffered by any other party relying upon the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions and should make their own inquiries and obtain independent advice in relation to such matters.

Data Must Not Be Separated from The Report

The report as a whole presents the site assessment, and must not be copied in part or altered in any way.

Logs, figures, drawings, test results etc. included in our reports are developed by professionals based on their interpretation of field logs (assembled by field personnel) and laboratory evaluation of field samples. These data should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

Partial Use of Report

Where the recommendations of the report are only partially followed, there may be significant implications for the project and could lead to problems. Consult Asset if you are not intending to follow all of the report recommendations, to assess what the implications could be. Asset does not accept responsibility for problems that develop where the report recommendations have only been partially followed if they have not been consulted.

Other Limitations

Asset will not be liable to update or revise the report to take into account any events or emergent circumstances or fact occurring or becoming apparent after the date of the report.